doubt, much to be learnt before we can say with certainty that we are dealing with mountain ranges pure and simple; but, as Prof. Campbell says, this hypothesis is a good one to work upon. The explanation, which assumes the presence of clouds, does not, as previously hinted at, seem to be any longer tenable, for would not permanent clouds (as these must necessarily be) at a considerable height mean land at a high altitude, and therefore mountains?

Those making measures of the positions of projections on the Martian terminator may find the following method of procedure, recommended by Prof. Campbell, serviceable:—"Marth's valuable ephemeris of Mars gives the 'position angle of the greatest defect of illumination.' With the micrometer wires set to that position angle, place the fixed wire tangent to the upper limb and bisect the projection with the movable wire. Again, place the fixed wire tangent to the lower limb, and bisect the projection with the movable wire. The diameter of the planet should also be measured, without changing the position angle of the wires. Irradiation caused by the bright polar cap is liable to increase some of the distances measured, especially with small telescopes."

Before concluding this brief summary, a few words may be added with respect to a recent note which appeared in these columns (p. 319), entitled "A Strange Light on Mars." The note in question was based on a telegram issued by the International Bureau, and referred to an observation made at the Nice Observatory. The "strange light" alluded to was regarded by the writer as referring to something quite exceptional, and *not* to the well-known prominences which during 1892 were so often seen, and which during this present period of opposition have been observed and measured several weeks before the telegram was dispatched.

W. J. S. LOCKYER.

NOTES.

THE funeral of Prof. von Helmholtz took place on September 13, at Charlottenburg. Among the numerous tributes of admiration were magnificent wreaths from the German Emperor and the Empress Frederick, both of whom were represented at the ceremony. Most of the learned societies of the capital and many of the Universities and scientific bodies in other parts of the Empire also sent representatives. Among those present at the funeral were Baron von Marschall, the Secretary of State for Foreign Affairs, Count Eulenburg, Dr. Miquel, Dr. von Bötticher, Herr von Schelling, and Herr Thielen.

WE are glad to learn that the Technical Education Board have made a grant of £500 to Bedford College (for Women), to aid in the full equipment of the laboratories of that institution.

THE *Lancet* states that the trustees of the late Mr. Richard Berridge have, with the consent of the Attorney-General, now handed to the British Institute of Preventive Medicine the residue of the legacy, amounting to over £20,000, for the purpose of building and endowing a laboratory for the chemical and bacteriological examination of water-supply and the investigation of processes of sewage purification. The permanent laboratory is now in course of erection on the site secured by the Institute at Chelsea, but, pending its completion, a temporary laboratory has been fitted up in order that the work may be at once proceeded with. Mr. Joseph Lunt, formerly assistant to Sir Henry Roscoe, has been appointed by the Institute to carry on this work under the director's supervision. The Institute is now, the *Lancet* understands, prepared to undertake the bacteriological and chemical examination of any samples of water which may be submitted. In addition to this, the Institute will give expert assistance in the bacteriological or pathological diagnosis of any pathological material. The demand for this kind of work has greatly increased, so much so that, although Dr. Ruffer will still retain charge of this department, a specially trained bacteriologist has been appointed to work under his direction. Particulars may be obtained by writing to the director at the temporary offices of the Institute, 101 Great Russell Street, London, W.C.

ACCORDING to the *British Medical Journal*, a Clinical Research Association has been formed, under the patronage of Sir James Paget, Dr. Wilks, Mr. Jonathan Hutchinson, Sir W. H. Broadbent, Sir George Humphrey, Dr. Clifford Allbutt, and others, with the object of assisting medical practitioners in the investigation and treatment of disease by furnishing trustworthy reports upon excretions, tumours, and other morbid products. A laboratory has been fitted up, and will be under the direction of Dr. J. Galloway and Messrs. J. H. Targett and F. G. Hopkins. Further particulars of the Association can be obtained from the secretary, Mr. C. H. Wells, 5 Denman Street, S.E.

A MEDICAL School for Women is to be established by the Russian Government at St. Petersburg. This step, which is said to be due to the influence of Prince Wolkowski, acquires additional importance from the fact that only a few years ago the Ministry of Instruction was strongly opposed to every movement favourable to the higher education of women. The fate of the new institution will, we hope, be happier than that of the one established by Prof. Gerie, which was closed in 1884.

AN international Congress of Chemistry and Microscopy will be held in Vienna during the last week of the present month. Dr. E. Ludwig is the president of the committee of arrangements, and the secretary is Dr. Hans Heger, I. Kolowratring, Pestalozzigasse 6, Vienna.

WE notice that in the Universal Exhibition to be held in Paris in 1900, there are to be sections devoted to hygiene, military and naval hygiene, and medicine and surgery.

INFORMATION has been received respecting an Exhibition of Industry which is to be held at Kioto from April 1 to July 31, 1895. The exhibition is the fourth of the kind organised by the Japanese Government, and will be divided into classes under the following heads:—Manufactures, Fine Arts, Agriculture, Waste Products, Education, Mines and Mining, and Machinery.

WE have on several occasions referred to the great landslip at Gohna, and on July 5 printed an illustrated abstract of the report upon it by Mr. T. H. Holland. The dam, as readers of our notes for August 30 are aware, burst on August 26, and, as a consequence, very considerable destruction of property ensued. Further information respecting the occurrence has now reached England, and the *Times* of Saturday last published the following interesting details received from a correspondent:—"On August 24, at 8 o'clock in the morning, an automatic bell, placed within a foot of the top of the dam, sounded the first note of alarm. The warning was communicated throughout the whole of the threatened territory almost instantaneously by means of telegraphic messages, bonfires, rockets, the beating of drums, and other signals, and the people immediately fled, with all their cattle and personal belongings, into the hills. In this way ample warning was given and the apprehended loss of life averted. Three hours after the first signal the water reached the lowest point of the ridge, and the officials thought it expedient to block the passage through which the torrent would first escape, so that the lake should not overflow before 7 o'clock on the morning of the 25th. Warning telegrams were despatched along the valley. The weather was very unfavourable for observation, a heavy mist obscuring the landscape. Signs of collapse were visible at 8 o'clock in the evening, and shortly before midnight the dam burst. A flood 30 feet high, sweeping onward with irresistible force, reached Chamoli, half-way between Gohna and Srinagar, at half-past 12 on the 26th. At 1 in the morning there was another tremendous rush of water, which descended with an awful roar; but nothing was visible owing to the constantly thickening mist. The flood travelled at an average rate of twenty-four miles an hour all down the valley, rising in places to a height of 200 feet. At Chamoli it rose to a height of 160 feet, destroying the bazaars and the hospital. At Srinagar the devastation was even more widespread. The flood reached Hardwar at 9 o'clock on Sunday, and by noon the river had risen 12 feet. It presented a magnificent spectacle, and the view from the surrounding heights was at once grand and terrible. At Hardwar all Government buildings, with the exception of the telegraph office, were destroyed. The whole lake was discharged in about two hours."

AT the August meeting of the Calcutta Microscopical Society, the retirement of Dr. William King from the Geological Survey of India was referred to, and a brief notice of his work in India, and especially in connection with the Society, was read. We take the following information from a report in the *Englishman*:—Dr. King joined the Geological Survey in Calcutta under its first Director, Dr. T. Oldham, in March 1857. In May of that year, a memorable month in Indian history for its connection with the mutiny of the Native Army, he went to Madras with the first survey party for that Presidency, under Mr. H. F. Blanford. Dr. King continued in Southern India for over twenty-five years, with only occasional visits to headquarters in Calcutta; and during that period he took part in the surveys of, or himself surveyed, the districts of the Coromandel and part of the Northern Sircars, working chiefly at the Crystalline, Transition, Vindhian, Gondwana, and Cretaceous formations of Peninsular India. In 1870 he became Superintendent of the Madras Survey Party, and the latter years of his work in Madras were spent in connecting the coastal Gondwanas of Nellore and the Godaveri District with the coal-bearing division of the series in the Central Provinces, by the Godaveri Valley and Western Hyderabad. After this Dr. King's labours lay in the Central Provinces, where in his progress over the Mandla and Bhundara districts, and eventually over the whole of Chattisgarh, he connected most of the rock formations of Southern India with those of the Central Provinces and Central India, up to the western frontiers of Chota Nagpur. In 1887 he became Director of the Geological Survey of India. During the period of his directorship the geology of the north-west frontier (particularly in Beluchistan and in the Salt Range) and of Burma, was considerably advanced in respect to the extent of area mapped, and its correlation with European and Europo-Asian geology. The mineral development of those regions in the way of coal, oil, and tin was also greatly advanced during the same period. Dr. King is the author of four memoirs on the geology of districts in the Madras Presidency, and of more than twenty reviews on the geology, or mineral condition, of other tracts. Dr. Simpson has been appointed President of the Microscopical Society of Calcutta, in the place of Dr. King.

THE Pilot Chart of the North Atlantic Ocean for September shows the remarkable drift of the derelict *Fannie E. Wolston*. On October 16, 1891, the vessel became a derelict not far distant from Cape Hatteras, and on June 13, 1892, was reported in 39° west longitude, from which position, after a number of irregular gyrations, she drifted back to about longitude 75° west by the end of January last, and on August 6 was again sighted in latitude 34° N. and 67° W. This vessel has thus been a derelict for over 1000 days, during which time she has drifted about 8600 miles. The American Hydrographer points out that the dangerous character of these derelicts is illustrated by the fact that during a period of seven years there have been forty-five collisions with them, which caused the total loss of nine vessels. The United States Government has employed the steamship *San Francisco* in destroying these obstructions, and during the above period sixty-nine have been burnt, and one blown up by torpedoes. The efficacy of destroying derelicts by fire is thus illustrated.

THE Italian Meteorological Office has published part 1 of its *Annali* for the year 1893, showing the work done in various departments of the service. Special studies of the behaviour of thunderstorms are carried on in the interest of agriculture, with the view of establishing for each province, and for each week of the year, the mean number of storms, distinguishing those which were accompanied with rain or hail, attention also being paid to the size of the hailstones. A list of all hailstorms which have occurred during a period of fifteen years is being prepared. The volume contains several discussions of earthquake shocks, especially those which occurred in Zante, in 1893. A new seismograph has been erected at the Collegio Romano, provided with a long and heavy pendulum, which registers shocks that occur at great distances. This instrument, which was devised by Dr. Agamennone, has worked so well that others are to be established in various parts of the kingdom. The department of terrestrial magnetism has been occupied with the preparation of a series of magnetic charts, and an account is given of some modifications and improvements made in a small portable magnetometer, for the study of local magnetic disturbances.

AN interesting paper on the temperature variation in the electrical resistance of some organic bodies (esters of the fatty acids), by Prof. A. Bartoli, is published in the *Proceedings* of the Reale Istituto Lombardo di Scienze e Lettere. The liquids examined were in most cases obtained from Kahlbaum, and the author gives their boiling point. The conclusions to which the author has come are as follows:—(1) In a series o esters derived from a given alcoholic radicle with different acids of the fatty series the conductivity, both at ordinary temperatures and at the boiling point, decreases with increase in the complexity of the constitution of the body. In addition, the alcoholic radicle affects the conductivity, which diminishes with increased complexity; thus, while methyl valerate conducts to a fair extent, amyl valerate is an insulator. (2) In general the conductivity of these esters increases with increase of temperature, the rate of change with temperature being smaller for those having a more complex composition than for those with a simpler formula. Thus, while the rate of change is considerable for amyl valerate, amyl butyrate, and isobutyl valerate, it is small in the case of methyl formate, methyl acetate, and ethyl formate. (3) Of the sixty different bodies experimented upon, one sample of ethyl acetate had a conductivity which decreased with increase of temperature; another sample of the same body, however, which the author considers to be purer, gave an increasing conductivity. A sample of isobutyl acetate also gave a negative rate of variation with temperature. These anomalous results the author considers to be due to the presence in the samples of a small quantity of one of the alcohols. (4) The addition of from 1 to 20 per cent. of any alcohol to any of the esters experimented upon, gives a solution of which the variation of the conductivity with temperature is negative, while the addition of a phenol, a ketone, an aniline, or a paraldehyde of any acid, gives a solution whose resistance increases with rise of temperature.

IN a paper contributed to the *Archives Néerlandaises*, M. P. Zeeman gives an account of the observations he has made of the Kerr phenomenon on the reflection from surfaces of iron, cobalt, and nickel in a magnetic field. The author has continued the experiments commenced by M. Sissingh, using a slightly modified form of apparatus. He finds that the difference between the observed and calculated phases (obtained from Lorentz's formulæ) is practically constant for radiation of all wave-lengths, and is equal to 80° in the case of iron. Similar results were obtained with nickel and cobalt. In the case of these two metals the author, after attempting to obtain suitable mirrors by the deposit of the metal on polished iron, or by electrolysis, was obliged to have plane faces cut on blocks of the pure metal, which when polished formed good mirrors.

THE specific heat of gases at constant pressure has been investigated by Dr. Silvio Lussana, by means of a new and ingenious apparatus. The contrivance, as described in the *Nuovo Cimento*, is intended to overcome the difficulty of providing a sufficient quantity of gas to experiment upon. With the resources of an ordinary physical laboratory it is difficult to obtain a pure gas in sufficient quantity to make an impression upon the calorimeter, so Dr. Lussana decided to use the same quantity over and over again. Two substantial iron tubes were placed vertically, and communicated at the bottom by means of an india-rubber tube strengthened with five layers of canvas. They were partly filled with mercury, and by elevating or lowering one of them the mercury could be made to completely fill the one or the other. When one tube was full of mercury, the other was filled with the gas to be investigated, and the amount of gas which filled the tube could be driven out and through the calorimeter by lowering the tube. The gas was then made to pass through an india-rubber tube leading to a brass worm immersed in a heating bath, and another immersed in water, which constituted the calorimeter. It then passed through a small subsidiary worm, to test whether it had lost all the heat acquired, and finally entered the other iron tube which was being emptied of mercury. By means of a short circuit provided with a valve, the gas and the mercury in the two iron tubes could be exchanged, and the same process repeated. The water equivalent of the calorimeter was determined experimentally by sending a measured quantity of hot water through it. To ensure constancy of pressure, the level of the mercury was always adjusted to the same fiducial mark on a short length of glass tubing introduced in the india-rubber tube. The gas was introduced by a Natterer compression pump. Seeing that pressures were employed up to forty atmospheres, special care had to be bestowed upon stop-cocks and junctions, some of which were constructed in a novel manner. The results of the measurements, which promise to be of great interest, will shortly be published.

THE May number of the *Transactions of the North of England Institute of Technical Brewing*, a copy of which has been sent to us, contains an interesting and very useful paper by Mr. Fellowes, on "Some of the micro-organisms causing the diseases of beer." Mention is made of the important services rendered by Pasteur, Hansen, Van Laer, Lindner and others to this subject, and we are introduced to quite a number of microbic foes with all of which the brewer has to wage war. The cause of viscosity in beers has recently been elaborately studied by Van Laer, who has isolated certain micro-organisms which he has classed together under the name of *Bacillus viscosus*. When these organisms are introduced into sterilised wort along with pure yeast, the liquid is rendered more or less ropy, the degree of viscosity depending upon the proportion in which the disease organism is introduced. Curiously, however, although the *Bacillus viscosus* behaves in this characteristic manner in the case of Belgian beers, so far, similar results have not been obtained with it when subjected to the English system of fermentation. Mr. Fellowes has himself isolated various organisms present in samples of viscid beer, but has not been able to obtain with such pure cultures or individual varieties a viscosity equal to that of the sample from which they were originally derived. He suggests that the cause of this failure may be sought in the probable modifications induced in the physiological character of the micro-organisms during the process of isolation by means of gelatine cultures. In support of this supposition he refers to Prof. Percy Frankland's investigations on the fermentation of calcium citrate by means of a particular bacillus, which although in the habit of fermenting this substance, for years past absolutely refused to do so when introduced into calcium citrate solutions direct from gelatine cultures. Mr. Fellowes is of opinion that the viscosity in English beers may be due to the associated action of various micro-organisms present, their activity depending not only on the particular varieties, but also on the relative numerical strength in which they are present. It is obvious that to obtain such particular conditions artificially is by no means an easy task, but there can be no doubt that a wide field for research on the question of symbiotic fermentation, or the associated life of micro-organisms, remains yet to be explored.

The *Berichte der Deutschen Botanischen Gesellschaft*, vol. xii. part 5, contains a paper, by J. E. Humphrey, on nucleoli and centrosomes. The author favours the theory that the nucleolus is not a definite organ of the nucleus, but regards it, with Strasburger and Guignard, as a reserve material of the nucleus. In this connection he examined the nuclei of the sporangia of *Psilotum triquetrum*, in which Karsten considers that the centrosomes of the dividing nuclei arise from the nucleoli, and after division are re-included in the daughter nuclei. His observations, however, lead him to the conclusion that the nucleoli and centrosomes are completely distinct from one another, and that the latter are altogether extra-nuclear. Another interesting result, which he obtained in the course of his observations, is that the body, which is often found in connection with the nuclei of the pollen-sac, and which has been called the "paranucleolus," is probably not a natural structure, but is formed during the process of fixing the material in which it is found, as it was seen regularly on that side of the nuclei which was the last to be reached by the fixing fluid.

NATURALISTS may sometimes have wondered that a region so classical in the annals of marine biology as the neighbourhood of St. Vaast-la-Hougue was not earlier made the site of one of those marine laboratories which our neighbours across the Channel conduct with such efficiency and economy. For some years past, however, the Museum of Natural History of Paris has been engaged in altering and refitting the extensive buildings of an ancient *lazaret* on the island of Tatihou to this end, and at the first September meeting of the Academy of Sciences M. Edmond Perrier was able to report the practical completion of the laboratory. A circulation of sea-water has been fitted up throughout the laboratories and tank-rooms, and marine animals of all kinds live perfectly within the aquaria. M. Malard-Duméril, the naturalist in charge, and his staff reside permanently upon the spot, and there is full accommodation for eighteen additional naturalists. The work of the new laboratory is not, however, to be limited to the promotion of pure scientific research, but, if the hopes of its founders are realised, will also include operations on a practical scale in marine pisciculture.

ON the title-page to the second edition of the "Manual of the Geology of India," recently noticed in NATURE, the name of the author of that edition alone appears. The Government of India, on this circumstance being brought to their notice, have ordered the title-page in question to be cancelled, and a revised title-page, with the names of the original authors of the work inserted, to be substituted.

WE are informed that Mr. J. Nisbet, some of whose books on Forestry were recently reviewed in these columns, has undertaken to contribute a series of short articles on "Birds in Relation to Forestry" to the Natural History Department of the *Yorkshire Weekly Post*.

THE syllabus of the Manchester Municipal Technical School and Municipal School of Art, for the session 1894-5, has just been issued, and may be obtained from the director and secretary, or the Guardian Printing Works, Manchester. Attention is drawn to several new subjects and courses of instruction, among which we may mention—honours classes in theoretical mechanics, applied mechanics and steam, a course of lectures in hygiene, and special courses in magnetism and electricity for telegraph employés.

THE fifth annual report of the Missouri Botanical Garden, covering the year 1893, has just come to hand, and forms a handsome volume. The year under review seems to have been a very satisfactory one for the garden, both from a financial and scientific standpoint. In addition to the reports of the officers of the Board and of the director, the volume contains several scientific papers, some of which are illustrated; there are also several well-executed process illustrations of objects of interest in the garden.

WE learn from the abstract of the *Proceedings* of the Linnean Society of New York for the year ending March 27, 1894, that at the annual meeting, held on the date mentioned, there were 136 resident and 35 corresponding members. At the beginning of the year the society had on its roll 37 resident and 37 corresponding members. During the year 29 papers were read, and 214 publications were added to the library.

MESSRS. J. AND A. CHURCHILL have sent us the new edition—the third—of the translation, by T. H. Waller and H. R. Procter, of Kohlrausch's "An Introduction to Physical Measurements." The present edition is translated from the seventh German edition, and contains nearly four times the number of pages than the first German edition, which appeared in 1869. The tables have been corrected to the present state of knowledge, and a good deal of new matter has been embodied in them.

A MAGAZINE entitled the *American Historical Register* has been started this month in Philadelphia, the special mission of which is to form the medium of inquiry and communication between the members of various American patriotic associations, to chronicle their proceedings, and to preserve in its pages matters of historical value and of personal interest to their members; it bears, therefore, the sub-title of "Monthly Gazette of the Patriotic-Hereditary Societies of the United States of America." The magazine is tastefully printed on good paper, and several successful process illustrations grace its pages.

THE *Journal* of the Royal Horticultural Society dated August has just reached us, and contains, in addition to the usual extracts from the *Proceedings* of the Society, the following papers:—"The Cedar of Goa," by Dr. M. T. Masters, F.R.S.; "The Deciduous Trees and Shrubs of Japan," by James H. Veitch; "Rare Trees and Shrubs in the Arnold Arboretum," by Maurice de Vilmorin; "Hybrid Narcissi," by the Rev. G. H. Engleheart; "Botanical Exploration in Borneo," by F. W. Burbidge; "Flowering Trees and Shrubs," by George Nicholson.

MESSRS. DULAU AND CO. have issued part xxxiv. of their catalogue of zoological and palæontological works, containing descriptions of the books on mammalia offered for sale by them.

WE have received from Dr. F. Krantz, Rhenish Mineral Office, Bonn-on-the-Rhine, a catalogue of minerals, and plates of minerals for exhibiting optical phenomena, which he has for sale.

THE additions to the Zoological Society's Gardens during the past week include a Common Marmoset (*Hapale jacchus*) from South-east Brazil, presented by Mr. J. C. Alleyne; a Boschbok (*Tragelaphus sylvaticus*, ♀) from South Africa, presented by Mr. J. E. Matcham; a Silver Pheasant (*Euplocamus nycthemerus*, ♀) from China, presented by Mr. Thomas Harris; a Larger Hill-Mynah (*Gracula intermedia*) from India, presented by Mr. Charles E. Brooke; a Cape Bucephalus (*Bucephalus capensis*) from South Africa, presented by Mr. A. W. Arrowsmith; a Common Chameleon (*Chamæleon vulgaris*) from North Africa, presented by Mr. G. T. Elphick; a Slowworm (*Anguis fragilis*), British, presented by Mr. G. H. Morton Middleton; a Malbrouck Monkey (*Cercopithecus cynosurus*, ♀) from West Africa, a Blue-fronted Amazon (*Chrysotis æstiva*), from South America, twenty Painted Terrapins (*Clemmys picta*) five Stink-pot Terrapins (*Aromochelys odorata*), an American Box Tortoise (*Terrapene carinata*) from North America, deposited; a —— Hedgehog (*Erinaceus*, sp. inc.) from India, a Mitred Guinea Fowl (*Numida mitrata*) from Madagascar, a Bull Frog (*Rana catesbiana*) from North America, purchased.

OUR ASTRONOMICAL COLUMN.

THE SEMI-ANNUAL VARIATION OF METEORS.—"It is a saying of Arago," wrote Prof. A. S. Herschel thirty years ago, "founded upon observation and confirmed by constant experience in later years, that the Earth encounters more shooting stars in going from aphelion to perihelion than in going from perihelion to aphelion." The fact of this semi-annual variation in the number of meteors has since been confirmed by many observers, and has also furnished a subject for much discussion. Mr. G. C. Bompas summarises the state of knowledge on the matter in the current number of the *Monthly Notices* of the R.A.S., and criticises the explanation believed to account for the facts of observation. The theory accepted by most observers is that the semi-annual variation referred to is due to the planetary motion of the Earth, just as the horary variation is due to the Earth's rotation. It will at once be seen that observations in the southern hemisphere supply a test of the validity of this explanation; for the greater number of meteors should appear in the southern hemisphere from January to June in each year—that is, when that hemisphere is in front of the Earth's orbital motion. From June to December, when the northern hemisphere is in front, we encounter a larger number of meteors than during the first half of the year. There can be no doubt that the change in the position of the Earth's axis relatively to her motion does really tend to increase the number of shooting stars seen in the second half of the year in the northern hemisphere, but Mr. Bompas thinks that this cause is insufficient to account for the very large increase observed, viz. from two to three times the number observed in the first half of the year. He has examined the meteor observations made by Dr. Neumayer at the Melbourne Observatory from 1858 to 1863, and he finds that the variation is not reversed, but follows the same law as in the northern hemisphere, the hourly number of meteors seen in the second half of the year exceeding the number seen in the first half. It seems, therefore, that some cause further than that hitherto assigned must help in producing the semi-annual variation of meteors. The whole discussion leads Mr. Bompas to submit: (1) That the explanation hitherto adopted of the semi-annual variation of meteors is inadequate; (2) that the variation is connected with and mainly due to the cosmical motion of the solar system; (3) that it renders highly probable the cosmical origin and motion of meteors.